

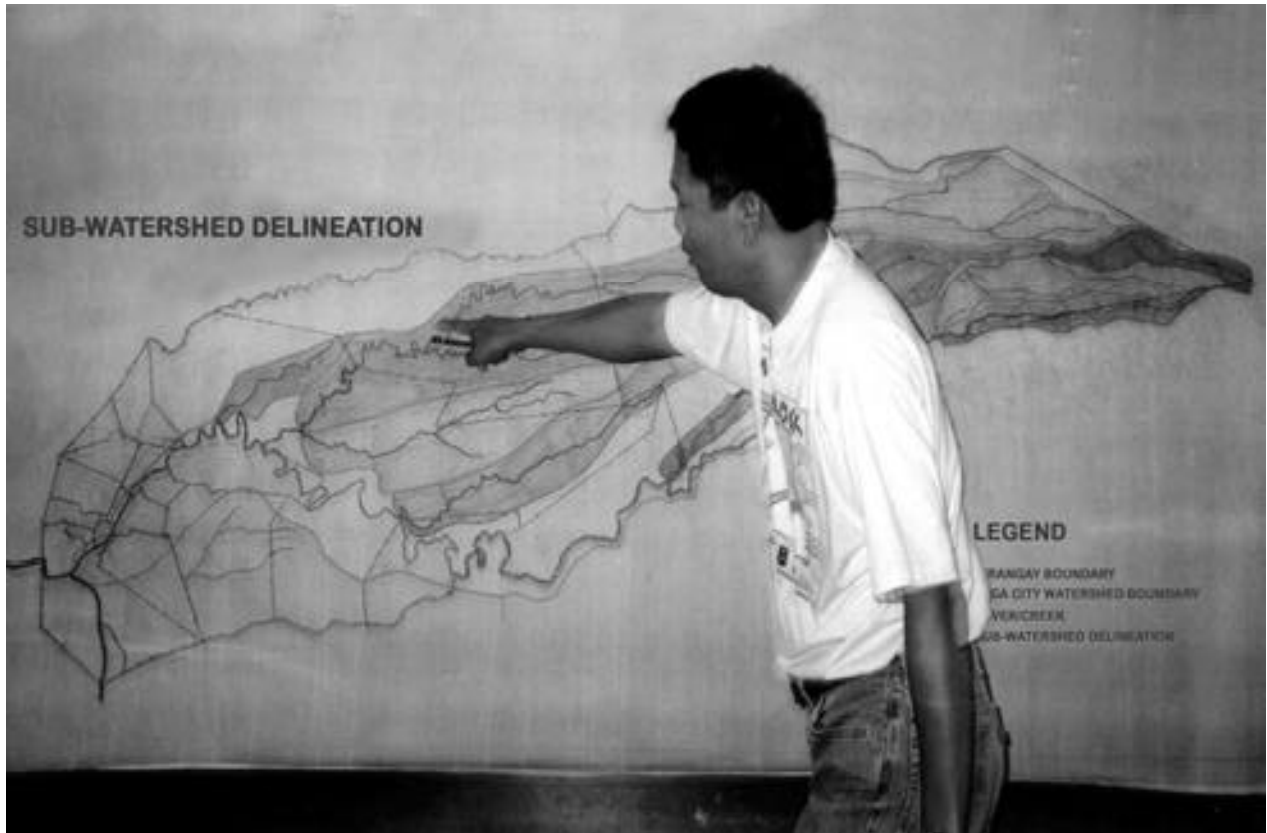
Delineating Boundaries of the Watershed Important to the Community



WATERSHED MANAGEMENT

Notes 2

Environmental Management



By identifying the natural boundaries and knowing the critical portions of a watershed, concerned local governments can focus necessary interventions and achieve desired outcomes.

Setting Boundaries and Responsibilities

A growing number of rural communities in the Philippines are concerned about the condition of watersheds that surround their settlements. They want to preserve their local water supply and reduce the occurrence or severity of local floods. Every rural community in the Philippines is located within the boundaries of a watershed. These local watersheds are usually only a part of a network of watersheds that protect a larger river system. Often the boundaries of these larger watersheds do not match local administrative boundaries. When several local government units (LGU) share a single watershed, then a collaborative approach to watershed management is desirable.

The simple act of delineating or mapping the watershed boundaries is a good way for a community to learn about its watershed and how it relates to those of neighboring communities. Oftentimes, destructive activities in one community will have serious consequences for communities downstream. LGUs that have encouraged all their communities to map their watershed boundaries have a clear advantage over other LGUs when optimizing the use of their own limited resources and when requesting external assistance.

Many believe that watershed management, especially watershed mapping, is a highly technical activity that must be left to national government agencies. In reality, an increasing number of LGUs are already planning and implementing watershed management programs in collaboration with their communities and their neighbors. Some have even received national awards for their efforts.

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Basic Steps To Delineate Watershed Boundaries

To manage the process of watershed delineation, an LGU should organize a team that will determine watershed boundaries. The team should be multi-sectoral and composed of representatives from the locality, including the Municipal Planning and Development Council (MPDC), academe, local DENR, and nongovernmental organizations (NGO)/people's organizations (PO).

This is how to conduct watershed delineation:

- Identify watershed boundaries using a topographic map (Figure 1) which shows high points such as peaks and ridges, and low points like valleys and floodplains. On the map, locate the main river and tributaries (stream and creeks) that feed into it. By grouping the creeks and streams, the watershed delineation team will be able to determine which waterway discharges into the same river, creek, or stream. Identify the highest points on the map and connect them to each other. These connected points establish the ridgeline which form the boundaries of the watershed. Validate the information on the ground by locating landmarks such as the peaks, junctions, rivers, creeks, and

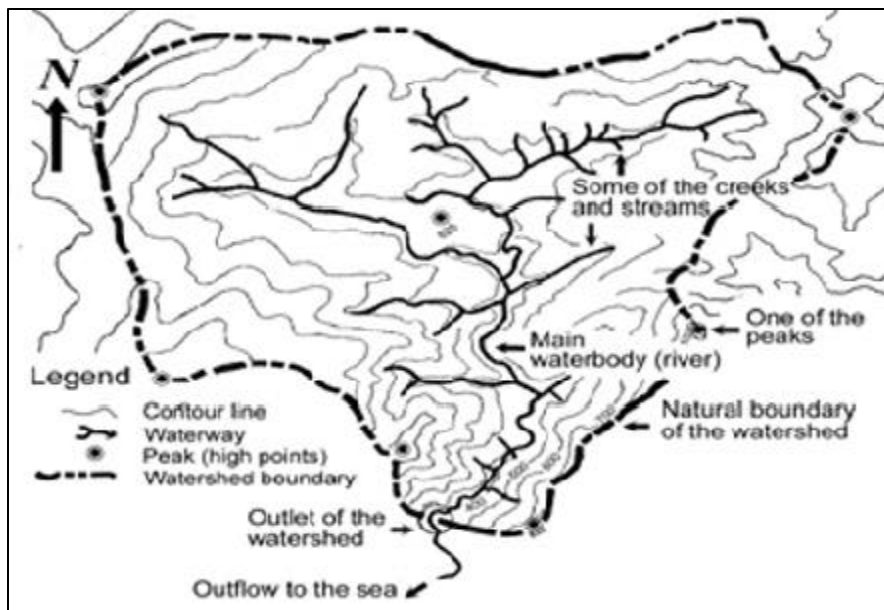


Figure 1. A watershed and river system delineated on a topographic map.

headwaters. Compare and match map with ground information.

- With the help of a topographic map and other relevant maps, identify and distinguish "ecological zones" or ecozones within the watershed. Ecological zones are areas with similar ecological characteristics as observed from the land-use pattern, slope, and the interaction between communities and their natural

environment. Ecozones include coastal zone, built-up/urban, agricultural, open uplands, natural forest, and water bodies. Mark ecozones on the map based on field observations.

- Determine the local government's administrative boundaries. Make an overlay map using a plastic sheet by tracing the local government's boundaries and overlay the same on the watershed map (Figure 2). Be sure that both maps are of the same scale.

- Determine who has responsibility for the watershed. Using the overlay map, check if your local government is solely responsible for managing the watershed. If other local governments' boundaries are within the same watershed, they also share the responsibility of managing the watershed. Answering these questions help achieve consensus in determining who takes primary and supporting roles in the planning and management of the watershed: From which local government does most of the water originate, e.g. source of water runoff and erosion. Which local government downstream receives most water? Which local government is most affected or benefits?

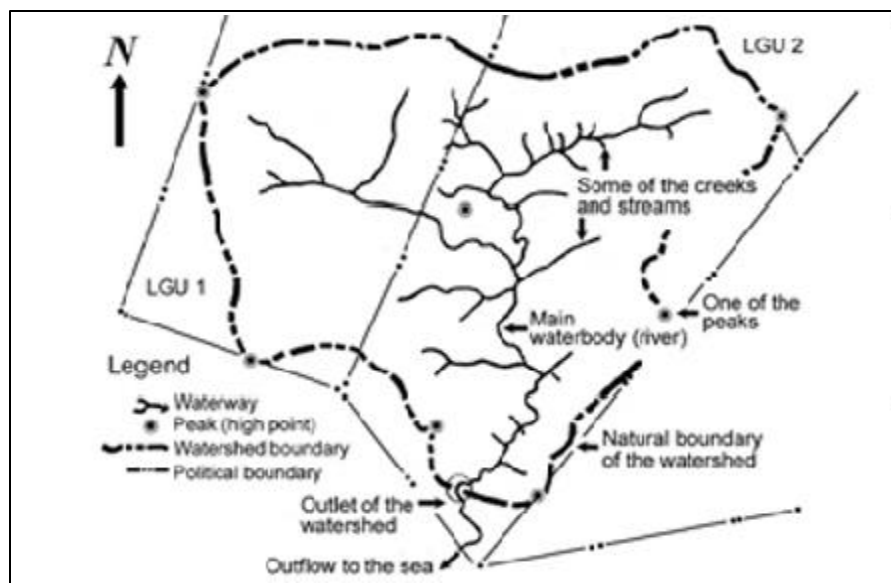


Figure 2. A watershed where two local government units are located.



Policy and Practice

Enabling Framework

Republic Act 7160, the Local Government Code, mandates local governments to take charge of their environment in general and their watershed in particular. Co-management with the Department of Energy and Natural Resources (DENR) of some timberlands to conserve community watersheds is now possible with interested local governments following the provisions of Joint Memorandum Circular 98-01 between the DENR, Department of Interior and Local Government (DILG), and the local government concerned.

The Forestry Reform Code provided by Presidential Decree 705 specifies watersheds as special natural systems that need to be managed carefully. To underscore this, the DENR issued DENR Administrative Order (DAO) 99-01 which mandates the adoption of the watershed as a basic planning unit and the conduct of characterization before the formulation of a watershed management plan covered by DAO 97-02.

Currently, certain nationally important watersheds classified as part of the National Integrated Protected Ar-

reas System (NIPAS) are managed by the Protected Areas Management Board (PAMB) where LGUs are expected to play a major role. In cases where two or more LGUs share a watershed, more than one local government representative sits in the PAMB.

The Agriculture and Fisheries Modernization Act (AFMA) requires that interventions in agricultural development should be planned using the watershed as the basic physical framework.

Practices That Are Working

The City Government of Naga is presently implementing the Strategic Watershed Management Plan for Naga City River. The watershed planning approach, focusing on the watershed as a planning unit to manage an area, requires clear and careful delineation of the watershed and sub-watersheds. It has enabled Naga City to identify all creeks and streams that join the Naga City River watershed. The approach has also revealed that hills and mountains surrounding the river determine the drainage and water flow.

Watershed delineation enabled Naga City to identify local governments that share the watershed with the City, especially its headwaters. Stakeholders used to working only within their political boundaries have become aware that their actions affecting the environment are interdependent.

An interesting feature of the Naga City initiative was the identification of different ecological zones (ecozones) within the watershed

namely, High Population Density, Agricultural, Timberland/Forest, and Riverbank eco-zones traversed by the Naga City River. Identifying these ecozones has enabled Naga City to classify and correlate impacts of

changing land use especially in the critical portions of the watershed. With limited resources, Naga City is able to prioritize and target zones needing immediate or long-term attention.



Delineation helped the City Government of Naga formulate their Strategic Watershed Management Plan for the Naga City River.



LGU Action Agenda

Other Initiatives

In the Province of Bulacan, perennial flooding and failure of stop-gap measures compelled the Provincial Government to change strategy. On a pilot scale, it adopted a watershed planning approach, focusing on the watershed as a planning unit. Agencies involved in flood prevention delineated the watershed collectively and studied the overall flood pattern, targeting specific areas in the watershed where flood management intervention could be best effected. Then they individually prepared agency investment plans. The framework was designed through efforts of an interagency Watershed Management and Flood Control Task Force organized and funded by the Provincial Government.

The Province of Bukidnon, containing the headwaters of a number of big river systems in Mindanao, has taken steps to delineate its wa-

tershed areas. Several municipalities, particularly Talakag, Valencia, Maramag, and Pangantukan, delineated their main and sub-water-

sheds as basis for their individual Municipal Watershed Management Plans using the watershed planning approach.



In the Province of Bulacan, national and local agencies involved in flood prevention collectively delineated the watershed affecting the town of Malolos, and targeted specific areas where flood interventions will be most effective.

Resources and References

Topographic and administrative maps to be used in delineating the watershed are available at:

- **National Mapping and Resources Information Authority (NAMRIA)**, Fort Bonifacio, Makati City, Tel. (02) 810-4835 to 37
- **Department of Environment and Natural Resources (DENR)**:
 - Watershed Management Division, **Forest Management Bureau (FMB)**, Tel. (02) 920-0374, 929-6626 local 2126
 - **Land Management Division (LMB)**, Tel. (02) 712-5278
 - Provincial and/or Community Environment and Natural Resources Office (PENRO/CENRO)
- **Department of Agriculture (DA)**, **Bureau of Soils and Water Management**, Elliptical Road, Quezon City, Tel. (02) 921-9321; 921-7825
- Local colleges and universities with colleges of agriculture, engineering, or forestry
- Local military commands

For assistance during actual delineation on the map or on site, local governments can use the services of the DENR-accredited survey, mapping, and planning (SMP) organizations. Local colleges and universities with agriculture, engineering, or forestry departments may also provide technical services as part of their research and extension service.

What You Can Do

To immediately conduct the analysis and decision-making process in watershed delineation, you need to produce working maps—an essential initial step. Since topographic and administrative maps come in different sizes, you have to convert them into a common, preferably larger scale. Reduce the administrative map (usually at 1:25,000 scale) to the scale of the available topographic map (1:50,000 scale) to make an overlay. To make an accurate conversion, use a pantograph, a device available at the DENR, Provincial Planning and Development Office, or engineering and forestry departments of schools, which you can learn how to use easily.